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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,867

Applicant(s)

NISHIMURA ET AL.

Examiner

CLAIRE L. RADEMAKER

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/30/09, 4/3/09, 6/2/09.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-50 is/are pending in the application.
4a) Of the above claim(s) 5-6 & 37-50 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 2-4 and 7-36 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 27 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB08)
Paper No(s)/Mail Date 4/3/09, 6/2/09.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

3 DETAILED ACTION

Response to Amendment

1. This office action is in response to the amendment filed on March 30, 2009.

Claims 2-4 & 7-36 are pending. Claims 5-6 & 37-50 are withdrawn due to restriction.

Claim 1 is cancelled.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 2-4, 7-8, & 14 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 9-10, & 13 of U.S. Patent No. 7,547,489. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim an electrochemical device comprising

an electrode plate assembly comprising at least one first electrode, at least one second electrode, and a separator interposed between the first and second electrodes, where said first electrode comprises a first current collector sheet and at least one first electrode mixture carried thereon, and where said second electrode comprises a second current collector sheet and at least one second electrode mixture carried thereon, where said first and second current collectors each have a conductive area and an insulating area, where said electrode plate assembly has a first side face and a second side face, such that the conductive area of said first current collector sheet is connected to and buried in a first terminal on said first side face and the conductive area of said second current collector sheet is connected to and buried in a second terminal on said second side face, and such that the insulating area of said first current collector sheet is positioned on said second side face to insulate said first current collector from said second terminal, and the insulating area of said second current collector sheet is positioned on said first side face to insulate said second current collector from said first terminal (instant Application, claims 2-4; U.S. Patent No. 7,547,489, claims 1, 9-10 & 13).

While U.S. Patent No. 7,547,489 fails to claim that the electrochemical device comprises a case and that the inner face of said case is in contact with said first and second side faces, one of ordinary skill in the art would understand that it would be obvious and advantageous to place the electrode plate assembly inside a case in order to protect the electrode plate assembly from outside elements (dirt, moisture, etc), and to have the case in contact with the side faces of the electrode plate assembly in order

to prevent the electrode plate assembly from shifting / moving around inside the case (which could cause damage to the electrode plate assembly).

Information Disclosure Statement

4. The information disclosure statement filed April 3, 2009 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. Specifically, an explanation of relevance or translation of the Japanese Office Action issued in Japanese Patent Application No JP 2003-091143 dated January 6, 2009 has not been received. It has been lined out and the information referred to therein has not been considered.

Furthermore, the information disclosure statement filed June 2, 2009 fails to comply with 37 CFR 1.98(a)(3) because it does not include a concise explanation of the relevance, as it is presently understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language. Specifically, an explanation of relevance or translation of the Japanese Office Action issued in Japanese Patent Application No JP 2003-409710 dated April 2, 2009 has not been received. It has been lined out and the information referred to therein has not been considered. Additionally, no explanation of relevance or translation of JP 11-505958 has been received. The reference has been placed in the Application file, and the information therein has been considered.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2-3 & 7-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Furthermore, claim 4 is further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation "insulating material portion" is indefinite because it is unclear exactly how this related to the "insulating area" of claim 2. For Examination purposes, the term "insulating material portion" has been interpreted as being synonymous with the term "insulating area".

Furthermore, claims 15 & 18 are further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "flame" is indefinite because it is unclear exactly what a "flame" is in this context or what is physically / structurally is required of the "flame". For Examination purposes, the "flame" has been interpreted as being a frame that surrounds the electrode plate assembly and is in contact with a first side face and second side face of the electrode assembly (claim 15) and where said frame comprises a slit / opening through which a lead piece can be drawn through (claim 18).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-4, 7-10, & 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2003/0104273) in view of Longhi, Jr. et al. (US 6,923,837).

With regard to claims 2-4, 7-8, & 24, Lee et al. teaches an electrochemical device (paragraphs [0002], [0020], & [0112]) comprising an electrode plate assembly (EPA) (paragraphs [0028] & [0054]), said EPA comprising:

At least one first electrode (8, paragraph [0054]; Figure 3) comprising a first current collector sheet (11, paragraph [0054]; Figure 3) and at least one first electrode mixture layer carried thereon (13, paragraph [0054]; Figure 3),

At least one second electrode (7, paragraph [0054]; Figure 3) comprising a second current collector sheet (12, paragraph [0054]; Figure 3) and at least one first electrode mixture layer carried thereon (14, paragraph [0054]; Figure 3), and

A separator interposed between the first electrode and the second electrode (15, paragraph [0055]; Figure 3),

Where said first current collector sheet comprises a first edge that has a part that extends from a first side of said EPA and does not carry said first electrode mixture on it (Figure 3), and where said second current collector comprises a second edge that has a part that extends from a second side of said EPA and does not carry said second electrode mixture on it (Figure 3),

and where at least one of the current collector sheets of the outermost two electrodes has a conductive area on both sides and has an electrode mixture layer only on one side facing the inner electrode (paragraphs [0060]-[0061] & [0112]; Figure 3),

But fails to teach first and second terminals, or teach that at least one of said first and second current collector sheets has a conductive area and an insulating area, or teach the specified orientation of said conductive areas and insulating areas with said first and second terminals.

Longhi, Jr et al. teaches the concept of an EPA having a first electrode & current collector sheet extend from a first side of said EPA and having a second electrode & current collector extend from a second side of said EPA, where said first side face and said second side face are positioned on opposite sides of said EPA (col. 8, lines 52-67 & col. 4, lines 29-30 & 37-44; Figure 10), where a first terminal / shoooping electrically connects to said first electrode & current collector sheet and a second terminal / shoooping electrically connects to said second electrode & current collector sheet, such that said first terminal / shoooping is provided on said first side face of said EPA and said second terminal / shoooping is provided on said second side face of said EPA (col. 8, lines 52-67; Figure 10), and where said first electrode & current collector sheet and said

second electrode & current collector sheet each have a conductive area connected to and buried in said first and second terminals, respectively, (col. 8, lines 52-67; Figure 10) and each have an insulating area (90, col. 8, lines 60-67; Figure 10) on said second and first side faces, respectively (col. 8, lines 60-67; Figure 10) such that said first terminal is insulated from said second electrode (col. 8, lines 60-67; Figure 10) and such that said second terminal is insulated from said first electrode (col. 8, lines 60-67; Figure 10),

and where the end current collector sheets of the outermost two electrodes each have a conductive area on both sides such that the conductive area on the outermost side of each of said current collectors are electrically connected to said respective terminals and serve as an extended part of said respective terminals (col. 4, lines 29-30 & 37-44 & Figure 10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having a first terminal / shoooping electrically connect to a first current collector sheet and a second terminal / shoooping electrically connect to a second current collector sheet, such that said first terminal / shoooping is provided on said first side face of said EPA and said second terminal / shoooping is provided on said second side face of said EPA of Longhi, Jr. et al. to the current collecting sheets of Lee et al. in order to provide improved connection of the current collectors that is easy to apply and that minimizes significant heating and resistance loss (col. 7, line 60 - col. 8, line 2). Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a first current collector sheet and a second

current collector sheet each having a conductive area connected to said first and second terminals, respectively, and each having an insulating area on said second and first side faces, respectively, such that said first terminal is insulated from said second electrode and such that said second terminal is insulated from said first electrode of Longhi, J r. et al. to the electrochemical device of Lee et. al. in order to prevent the electrochemical device from short circuiting (8, lines 60-67).

The Examiner notes that the limitations "when said first current collector sheet has a conductive area and an insulating area..." (claim 2) and "when said second current collector sheet has a conductive area and an insulating area..." (claim 2) are interpreted as meaning to say that that at least one of the first and second current collectors has a conductive area and an insulating area, and thus "[if/]when said first current collector sheet has a conductive area and an insulating area..." and thus "[if/]when said second current collector sheet has a conductive area and an insulating area..." according to the explanation given in the instant Specification (bottom page 3 - top page 4).

With regard to claims 9-10, Lee et al. fails to specifically state that said EPA comprises a third side face or a fourth side face, or teach that an edge of said first current collector sheet, an edge of said second current collector sheet, and an edge of said separator are flush with one another on each of said first side faces, said second side faces, said third side faces, or said fourth side faces, or teach the specified surface area relationships between the current collectors and the separator.

Longhi, Jr et al. teaches the concept of an edge of said first electrode & current collector and an edge of said second electrode & current collector sheet can be flush on a first side face, a second side face, a third side face, and a fourth side face of said EPA (col. 11, lines 50-55; Figures 10-11).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of said first current collector sheet being flush with an edge of said second current collector sheet flush on a first side face, a second side face, a third side face, and a fourth side face said EPA of Longhi, Jr. et al. to the current collectors of Lee et al. in order to make the manufacturing process easier and faster.

Modified Lee et al. fails to teach that the separator can be flush with the first and second current collector sheets on a first side face, a second side face, a third side face, and a fourth side face of said EPA, or teach the specified surface area relationships between the current collectors and the separator.

While modified Lee et al. fails to teach that the separator can be flush with the first and second current collector sheets on a first side face, a second side face, a third side face, and a fourth side face of said EPA, or teach the specified relationship between the current collectors and the separator, one of ordinary skill in the art would understand that it would be advantageous to have the separator be flush with the first and second current collector sheets on a first side face, a second side face, a third side face, and a fourth side face of said EPA thereby having the area per one side of said first current collector ($S(1)$), the area per one side of said second current collector ($S(2)$), and the area per one side of said separator ($S(s)$) all be the same ($S(1) = S(2) =$

S(3)), which would meet the relationships $S(1) \leq S(s) \leq S(1) * 1.05$ and $S(2) \leq S(s) \leq S(2) * 1.05$, in order to make the manufacturing process easier and faster (if the separator is not flush with the first and second current collector sheets on a first side face, a second side face, a third side face, and a fourth side face of said EPA, then the process of stacking the sheets / layers becomes more complicated and the possibility of sheet / layer alignment problems is increased).

9. Claims 11-13, 30-31, 33, & 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2003/0104273) in view of Longhi, Jr. et al. (US 6,923,837) and Dudley et al. (US 2002/0197535).

With regard to claims 11-12, 30, & 35-36, Lee et al. teaches an electrochemical device (paragraphs [0002], [0020], & [0112]) comprising an electrode plate assembly (EPA) (paragraphs [0028] & [0054]), said EPA comprising:

At least one first electrode (8, paragraph [0054]; Figure 3) comprising a first current collector sheet (11, paragraph [0054]; Figure 3) and at least one first electrode mixture layer carried thereon (13, paragraph [0054]; Figure 3),

At least one second electrode (7, paragraph [0054]; Figure 3) comprising a second current collector sheet (12, paragraph [0054]; Figure 3) and at least one first electrode mixture layer carried thereon (14, paragraph [0054]; Figure 3), and

A separator interposed between the first electrode and the second electrode (15, paragraph [0055]; Figure 3),

Where said first current collector sheet comprises a first edge that has a part that extends from a first side of said EPA and does not carry said first electrode mixture on it (Figure 3), and where said second current collector comprises a second edge that has a part that extends from a second side of said EPA and does not carry said second electrode mixture on it (Figure 3),

But fails to teach first and second terminals, or teach that at least one of said first and second current collector sheets has a conductive area and an insulating area, teach that said first and second electrode mixture layers have an edge covered with an insulating material, or teach the specified position of the insulating material on said first and second electrode mixture layers, or teach the specified composition of the insulating material.

Longhi, Jr et al. teaches the concept of an EPA having a first electrode & current collector sheet extend from a first side of said EPA and having a second electrode & current collector extend from a second side of said EPA, where said first side face and said second side face are positioned on opposite sides of said EPA (col. 8, lines 52-67 & col. 4, lines 29-30 & 37-44; Figure 10), where a first terminal / shoooping electrically connects to said first electrode & current collector sheet and a second terminal / shoooping electrically connects to said second electrode & current collector sheet, such that said first terminal / shoooping is provided on said first side face of said EPA and said second terminal / shoooping is provided on said second side face of said EPA (col. 8, lines 52-67; Figure 10), and where said first electrode & current collector sheet and said second electrode & current collector sheet each have a conductive area connected to

and buried in said first and second terminals, respectively, (col. 8, lines 52-67; Figure 10) and each have an insulating area (90, col. 8, lines 60-67; Figure 10) on said second and first side faces, respectively (col. 8, lines 60-67; Figure 10) such that said first terminal is insulated from said second electrode (col. 8, lines 60-67; Figure 10) and such that said second terminal is insulated from said first electrode (col. 8, lines 60-67; Figure 10),

and where the end current collector sheets of the outermost two electrodes each have a conductive area on both sides such that the conductive area on the outermost side of each of said current collectors are electrically connected to said respective terminals and serve as an extended part of said respective terminals (col. 4, lines 29-30 & 37-44 & Figure 10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having a first terminal / shoothing electrically connect to a first current collector sheet and a second terminal / shoothing electrically connect to a second current collector sheet, such that said first terminal / shoothing is provided on said first side face of said EPA and said second terminal / shoothing is provided on said second side face of said EPA of Longhi, Jr. et al. to the current collecting sheets of Lee et al. in order to provide improved connection of the current collectors that is easy to apply and that minimizes significant heating and resistance loss (col. 7, line 60 - col. 8, line 2). Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a first current collector sheet and a second current collector sheet each having a conductive area connected to said first and

second terminals, respectively, and each having an insulating area on said second and first side faces, respectively, such that said first terminal is insulated from said second electrode and such that said second terminal is insulated from said first electrode of Longhi, J. r. et al. to the electrochemical device of Lee et. al. in order to prevent the electrochemical device from short circuiting (8, lines 60-67).

Modified Lee et al. fails to teach that said first and second electrode mixture layers have an edge covered with an insulating material, or teach the specified position of the insulating material on said first and second electrode mixture layers.

Dudley et al. teaches the concept of an EPA having a first side face and a second side face, where a current collector extends from a first side face of the EPA (paragraph [105]; Figure 6C), and where an insulating material (110, paragraphs [0105]-[0106]) covers the edges of electrode mixture layers (paragraphs [0105]-[0106]) on the second side face (Figure 6C) in order to provide the electrode mixture layers with insulating barriers between the cathode, anode, and current collector on a side of the EPA opposite the side where the corresponding current collector is extending out (paragraph [0106]; Figure 6C).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having an insulating material cover the edges of electrode mixture layers on a face of Dudley et al. to the EPA of modified Lee et al. in order to provide the electrode mixture layers with insulating barriers between the cathode, anode, and current collector on a side of the EPA opposite the side where the corresponding current collector is extending out (paragraph [0106]; Figure 6C).

The Examiner notes that claim 30 recites that said insulating material comprises "at least one selected from the group consisting of a resin coating and a resin tape" (claim 30), and that the limitation of the insulating material consisting of a resin coating is rejected above. Therefore, claims 35-36, which depend from claim 30, are also rejected above where the limitation "a resin coating film" was rejected.

The Examiner notes that the limitations "when said first current collector sheet has a conductive area and an insulating area..." (claim 11) and "when said second current collector sheet has a conductive area and an insulating area..." (claim 11) are interpreted as meaning to say that that at least one of the first and second current collectors has a conductive area and an insulating area, and thus "[if/]when said first current collector sheet has a conductive area and an insulating area..." and thus "[if/]when said second current collector sheet has a conductive area and an insulating area..." according to the explanation given in the instant Specification (bottom page 3 - top page 4).

With regard to claim 13, modified Lee et al. fails to specifically state that the insulating material covering the edges of the electrode mixture layers on a side of the EPA opposite the side where the corresponding current collector is extending out would be adjacent to the insulating area of said current collectors.

While modified Lee et al. fails to specifically state that the insulating material covering the edges of the electrode mixture layers on a side of the EPA opposite the side where the corresponding current collector is extending out would be adjacent to the

insulating area of said current collectors, one of ordinary skill in the art at the time of the invention would understand that Lee et al. as modified by Longhi, Jr. et al. and Dudley et al. as discussed above would obviously result in the insulating material covering the edges of the electrode mixture layers on a side of the EPA opposite the side where the corresponding current collector is extending out being adjacent to the insulating area of the current collectors (see Lee et al.: Figures 5A-5B, Longhi, Jr. et al.: Figure 10, & Dudley et al.: Figure 6C).

The Examiner notes that the limitations "when said first current collector sheet has a conductive area and an insulating area..." (claim 13) and "when said second current collector sheet has a conductive area and an insulating area..." (claim 13) are interpreted as meaning to say that that at least one of the first and second current collectors has a conductive area and an insulating area, and thus "[if/]when said first current collector sheet has a conductive area and an insulating area..." and thus "[if/]when said second current collector sheet has a conductive area and an insulating area..." according to the explanation given in the instant Specification (bottom page 3 - top page 4).

With regard to claims 31 & 33, the product-by-limitations of claims 31 & 33 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (MPEP 2113). Moreover, a product-by-process limitation is held to be obvious if the product is similar

to a prior art product (MPEP 2113). Claims 31 & 33 as written do not distinguish the product of the instant application from the product of the prior art.

10. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2003/0104273) in view of Longhi, Jr. et al. (US 6,923,837) and Lyman (US 5,567,544).

With regard to claims 14-15, Lee et al. teaches an electrochemical device (paragraphs [0002], [0020], & [0112]) comprising an electrode plate assembly (EPA) (paragraphs [0028] & [0054]), said EPA comprising:

At least one first electrode (8, paragraph [0054]; Figure 3) comprising a first current collector sheet (11, paragraph [0054]; Figure 3) and at least one first electrode mixture layer carried thereon (13, paragraph [0054]; Figure 3),

At least one second electrode (7, paragraph [0054]; Figure 3) comprising a second current collector sheet (12, paragraph [0054]; Figure 3) and at least one first electrode mixture layer carried thereon (14, paragraph [0054]; Figure 3), and

A separator interposed between the first electrode and the second electrode (15, paragraph [0055]; Figure 3),

Where said first current collector sheet comprises a first edge that has a part that extends from a first side of said EPA and does not carry said first electrode mixture on it (Figure 3), and where said second current collector comprises a second edge that has a

part that extends from a second side of said EPA and does not carry said second electrode mixture on it (Figure 3),

But fails to teach first and second terminals, or teach that at least one of said first and second current collector sheets has a conductive area and an insulating area, or teach a case of a specified structure.

Longhi, Jr et al. teaches the concept of an EPA having a first electrode & current collector sheet extend from a first side of said EPA and having a second electrode & current collector extend from a second side of said EPA, where said first side face and said second side face are positioned on opposite sides of said EPA (col. 8, lines 52-67 & col. 4, lines 29-30 & 37-44; Figure 10), where a first terminal / shoooping electrically connects to said first electrode & current collector sheet and a second terminal / shoooping electrically connects to said second electrode & current collector sheet, such that said first terminal / shoooping is provided on said first side face of said EPA and said second terminal / shoooping is provided on said second side face of said EPA (col. 8, lines 52-67; Figure 10), and where said first electrode & current collector sheet and said second electrode & current collector sheet each have a conductive area connected to and buried in said first and second terminals, respectively, (col. 8, lines 52-67; Figure 10) and each have an insulating area (90, col. 8, lines 60-67; Figure 10) on said second and first side faces, respectively (col. 8, lines 60-67; Figure 10) such that said first terminal is insulated from said second electrode (col. 8, lines 60-67; Figure 10) and such that said second terminal is insulated from said first electrode (col. 8, lines 60-67; Figure 10),

and where the end current collector sheets of the outermost two electrodes each have a conductive area on both sides such that the conductive area on the outermost side of each of said current collectors are electrically connected to said respective terminals and serve as an extended part of said respective terminals (col. 4, lines 29-30 & 37-44 & Figure 10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having a first terminal / shoeing electrically connect to a first current collector sheet and a second terminal / shoeing electrically connect to a second current collector sheet, such that said first terminal / shoeing is provided on said first side face of said EPA and said second terminal / shoeing is provided on said second side face of said EPA of Longhi, Jr. et al. to the current collecting sheets of Lee et al. in order to provide improved connection of the current collectors that is easy to apply and that minimizes significant heating and resistance loss (col. 7, line 60 - col. 8, line 2). Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of a first current collector sheet and a second current collector sheet each having a conductive area connected to said first and second terminals, respectively, and each having an insulating area on said second and first side faces, respectively, such that said first terminal is insulated from said second electrode and such that said second terminal is insulated from said first electrode of Longhi, J. r. et al. to the electrochemical device of Lee et. al. in order to prevent the electrochemical device from short circuiting (8, lines 60-67).

Modified Lee et al. fails to teach a case of a specified structure.

Lyman teaches an electrochemical device (col. 4, lines 36-39; Figures 5 & 7) comprising multiple EPAs (col. 4, lines 36-39 & col. 11, lines 30-56; Figures 5 & 7) and a case (54 & 56 & 52, col. 6, lines 31-47; Figures 5 & 7) accommodating said EPAs (col. 6, lines 31-47; Figures 5 & 7), where said case comprises a frame (52, col. 6, lines 31-47; Figures 5 & 7) and two flat sheets (54 & 56, col. 6, lines 31-47; Figures 5 & 7) such that said frame surrounds the EPAs and is in contact with said first and second side faces of said EPAs (col. 6, lines 31-47; Figures 5 & 7), and such that said two flat sheets cover two openings of said frame (col. 6, lines 31-47; Figures 5 & 7) and are in contact with upper and lower faces of said EPAs (col. 6, lines 31-47; Figures 5 & 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the case of Lyman to the electrochemical device of modified Lee et al. in order to protect the EPAs and ensure the EPAs stay in specified orientations / locations with respect to each other (col. 6, lines 30-34).

With regard to claim 16, modified Lee et al. fails to teach that the case can comprise a container and one flat sheet instead of a frame with two flat sheets.

While modified Lee et al. fails to teach that the case can comprise a container and one flat sheet instead of a frame with two flat sheets, one of ordinary skill in the art at the time of the invention would understand that it would be advantageous to combine one flat sheet and the frame to make a container that the other flat sheet can fit on in order to decrease the possibility of alignment problems among the EPAs, the frame, and the flat sheets, thereby increasing ease of manufacturing.

The Examiner notes that the limitations "when said first current collector sheet has a conductive area and an insulating area..." (claim 14) and "when said second current collector sheet has a conductive area and an insulating area..." (claim 14) are interpreted as meaning to say that that at least one of the first and second current collectors has a conductive area and an insulating area, and thus "[if/]when said first current collector sheet has a conductive area and an insulating area..." and thus "[if/]when said second current collector sheet has a conductive area and an insulating area..." according to the explanation given in the instant Specification (bottom page 3 - top page 4).

With regard to claims 17-19, modified Lee et al. fails to teach lead piece(s) connected to said first and/or second terminals and drawn out of said case through a slit in said case frame / sidewalls.

Lyman teaches the concept of having leads / pins (60 / 180, col. 6, lines 47-53 & col. 13, lines 50-54; Figures 12 & 5 & 7) connect to the anode and cathode, which comprise current collectors (col. 4, lines 36-39 & col. 11, lines 30-56; Figures 5 & 7), of an EPA (col. 4, lines 36-39 & col. 11, lines 30-56; Figures 5 & 7) and be drawn out of / extend through a slit / hole in the case frame / sidewalls (col. 6, lines 47-53 & col. 13, lines 50-54; Figures 12 & 5 & 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having leads / pins connect to current collectors /

terminals of an EPA and be drawn out of / extend through a slit / hole in the case frame / side walls of Lyman to the electrochemical device of modified Lee et al. in order to allow easy utilization of the power the electrochemical device provides.

11. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2003/0104273) in view of Longhi, Jr. et al. (US 6,923,837), as applied to claim 2 above, and further in view of Kawakami et al. (US 6,051,340).

With regard to claims 20-22, Lee et al. teaches that the first and second current collectors can be metal foil (paragraphs [0007] & [0054]), but fails to teach that the first and second current collectors and terminals can be made of the specified materials.

Kawakami et al. teaches that current collectors can be made in a foil-like form, mesh form, porous form-like sponge form, or punching metal form (col. 14, lines 40-42), and can be made of a metal or metal alloy such as Sn, Sn-Bi, or Sn-Pb (col. 14, lines 43-46 & 60-63), or can be made of a mixture of fine conductive particles (col. 14, line 65 - col. 15, line 2) and a polymer such as fluorine-containing resin or silicone resin (col. 14, line 65 - col. 15, line 2 & col. 15, lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the current collectors of modified Lee et al. with the current collectors of Kawakami et al. because these are known to be effective current collectors in batteries and one would have a reasonable expectation of success in doing so.

Modified Lee et al. fails to teach that the current collectors and terminals can be made of the same material.

While modified Lee et al. fails to teach that the current collectors and terminals can be made of the same material, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the current collectors and terminals out of the same material because this practice is commonly known in the art, as evidenced by Brown et al. (US 2003/0113632, paragraph [0035]) and one would have a reasonable expectation of success in doing so.

12. Claims 23 & 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2003/0104273) and Longhi, Jr. et al. (US 6,923,837), as applied to claims 7 & 9 above, and further in view of Lyman (US 5,567,544).

With regard to claim 23, Lee et al. fails to teach that a metal lead is welded to each of said first and second terminals.

Lyman teaches the concept of having leads / pins (60 / 180, col. 6, lines 47-53 & col. 13, lines 50-54; Figures 12 & 5 & 7) connect to the anode and cathode, which comprise current collectors (col. 4, lines 36-39 & col. 11, lines 30-56; Figures 5 & 7), of an EPA (col. 4, lines 36-39 & col. 11, lines 30-56; Figures 5 & 7) and be drawn out of / extend through a slit / hole in the case frame / sidewalls (col. 6, lines 47-53 & col. 13, lines 50-54; Figures 12 & 5 & 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the concept of having leads / pins connect to current collectors / terminals of an EPA and be drawn out of / extend through a slit / hole in the case frame / side walls of Lyman to the electrochemical device of modified Lee et al. in order to allow easy utilization of the power the electrochemical device provides.

With regard to claims 25-29, Lee et al. teaches that its separators can be made of polypropylene (paragraph [0016]), but fails to teach that at least one of said third side face and fourth side face is covered with an electronically insulating porous material.

Lyman teaches an electrochemical device (col. 4, lines 36-39; Figures 5 & 7) comprising multiple EPAs (col. 4, lines 36-39 & col. 11, lines 30-56; Figures 5 & 7) and a case (54 & 56 & 52, col. 6, lines 31-47; Figures 5 & 7) accommodating said EPAs (col. 6, lines 31-47; Figures 5 & 7), where said case comprises a frame / film-shaped member (52, col. 6, lines 31-47; Figures 5 & 7), made of electronically insulating material polypropylene (col. 6, lines 33-36), and two flat sheets (54 & 56, col. 6, lines 31-47; Figures 5 & 7) such that said frame surrounds the EPAs and covers and is joined to said third and fourth side faces of said EPAs (col. 6, lines 31-47; Figures 5 & 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to add the case of Lyman to the electrochemical device of modified Lee et al. in order to protect the EPAs and ensure the EPAs stay in specified orientations / locations with respect to each other (col. 6, lines 30-34).

Modified Lee et al. fails to teach that the frame / film-shaped member is made of porous polypropylene.

While modified Lee et al. fails to teach that the frame / film shaped member is made of porous polypropylene, one of ordinary skill in the art would understand that it would be obvious to make the frame / film shaped member of modified Lee et al. out of the same type of polypropylene as the separators of modified Lee et al. which can be polypropylene coated with porous polypropylene (Lee et al.; (paragraphs [0030]-[0033], [0055], [0016], & [0069])).

13. Claims 32 & 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 2003/0104273), Longhi, Jr. et al. (US 6,923,837), and Dudley et al. (US 2002/0197535), as applied to claims 31 & 30 above, respectfully, and further in view of Yamashita et al. (US 6,287,720).

With regard to claims 32 & 34, modified Lee et al. fails to teach the specified composition of said insulating material.

Yamashita et al. teaches that polyester resin, polyacrylonitrile, polymethyl methacrylate, polyvinylidene fluoride polyethylene oxide, and polypropylene oxide are all insulating materials (col. 6, lines 58-59 & col. 7, lines 7-18) that can be used in batteries (col. 6, lines 40-42).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the polyester insulating material of modified Lee et al. with the

polyacrylonitrile, polymethyl methacrylate, polyvinylidene fluoride polyethylene oxide, or polypropylene oxide insulating material of Yamashita et al. because polyacrylonitrile, polymethyl methacrylate, polyvinylidene fluoride polyethylene oxide, and polypropylene oxide are known to be effective insulating materials in a battery and because polyacrylonitrile, polymethyl methacrylate, polyvinylidene fluoride polyethylene oxide, and polypropylene oxide are known equivalents with polyester resin insulating material and therefore one would have a reasonable expectation of success in doing so.

Response to Arguments

Claim Rejections - 35 USC § 103

14. Applicant's arguments, see Applicant's Response pages 17-18, filed March 30, 2009, with respect to the rejections of claims 1-4, 7-36 under 103 have been fully considered and are persuasive because insulation layer 52 of Lyman is not a part of a current collector, because the prior Office Action improperly substituted conductive sheet 58 of Lyman for current collectors 28 & 34 of Lyman, because conductive sheet 58 of Lyman does not have a first and second electrode mixture thereon, and because the prior Office action did not make the rejection of claims 7-8 clear. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new grounds of rejection is made in view of Lee et al. (US 2003/0104273), Longhi, Jr. et al. (US 6,923,837), Dudley et al. (US 2002/0197535), Lyman (US 5,567,544), Kawakami et al. (US 6,051,340), and Yamashita et al. (US 6,287,720).

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CLAIRE L. RADEMAKER whose telephone number is (571)272-9809. The examiner can normally be reached on Monday - Friday, 8:00AM - 4:30PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. L. R./
Examiner, Art Unit 1795

/Jennifer K. Michener/
Supervisory Patent Examiner, Art Unit 1795

